

**CORK INSTITUTE OF TECHNOLOGY  
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ**

**Autumn Examinations 2017/18**

**Module Title: Business Mathematics for Hospitality**

**Module Code: MATH 6025**

**School: School of Tourism and Hospitality**

**Programme Title:** Higher Certificate in Hospitality Studies – Year 1  
Higher Certificate in Arts – Year 2  
Bachelor of Business in Bar Management – Year 1  
Bachelor of Business in Culinary Arts – Year 1  
Bachelor of Business in Hospitality Management – Year 1

**Programme Code:** CR\_OCULS\_6  
CR\_OHOST\_6  
CR\_OBARM\_7  
CR\_OCULA\_7  
CR\_OHCMA\_7

**External Examiner(s): Prof. Michael Wallace**  
**Internal Examiner(s): Mr. J. Plaice, Ms. J.English**

**Instructions: Answer Three Questions.**

**Duration: 2 HOURS**

**Sitting: Autumn 2018**

**Requirements for this examination:**

**Note to Candidates:** Please check the Programme Title and the Module Title to ensure that you are attempting the correct examination.  
If in doubt please contact an Invigilator.

### Question 1

The following recipe yields 4 portions

Open Seafood Ravioli

Quantity		Ingredients	Unit Price	Unit
350	g	Assorted Fish	€8.50	kg
200	ml	White Wine Sauce	€5.00	litre
120	g	Breadcrumbs	€2.40	kg
50	g	Pesto	€0.02	kg
1	g	Peas	€0.78	kg
4		Tomatoes – Cherry Vine Tomatoes	€0.17	each
50	g	Lasagne Sheets	€0.04	g

- Calculate the portion cost, including 4% for wastage (15 Marks)
- From the portion cost, price the dish for a bar food menu using a Gross Profit Margin Percentage of 70% and a VAT rate of 9%. (10 Marks)

### Question 2

Compare the performance of the following two hotels using Rooms division statistics.

The Falkensteiner Hotel has 200 rooms, 50 are twins (€100 per person sharing per night), 60 are doubles (€100 per person sharing per night) and 90 are singles (€120 per room per night). On the night of the 9<sup>th</sup> of July 2018 the night auditor counted 199 rooms occupied, 45 twins, 50 doubles and the remaining 104 rooms are singles. Rooms Revenue for the 9<sup>th</sup> of July 2018 for the Falkensteiner Hotel was €25,500.

The Donat hotel has 200 rooms (Rack Rates for all rooms is €135 per room),: 50 of them are single and 150 are doubles. On the night of the 9<sup>th</sup> of July 2018, The Donat Hotel's night auditor counted a total of 135 rooms occupied, 85 of which were occupied by more than one guest. Rooms Revenue for the 9<sup>th</sup> of July 2018 for The Donat Hotel was €18,000.

- Identify relevant Rooms Division Statistics that would allow for the direct comparison of the aforementioned hotel properties. (20 Marks)
- Use your chosen statistics to write a brief commentary comparing the two properties performance in relation to the respective rooms division. (5 Marks)

### Question 3

The number of daily orders to a local bakery have been taken and the results recorded as follows:

44	51	48	50	38	28	15
25	41	20	12	74	79	57
40	52	46	67	21	65	28
51	22	34	51	15	39	48
61	77	60	55	48	34	29
45	56	65	46	47	63	23

- (i) Organise the data into 7 classes, each of equal width (starting with the class 10 but less than 20). (6 marks)
- (ii) Construct a cumulative frequency table and represent the information on an ogive. (9 marks)
- (iii) Estimate the median from the ogive. Check your answer by a suitable formula. (6 marks)
- (iv) What percentage of daily orders are greater than 43? (4 marks)

### Question 4

The following table shows how the salaries earned by the employees of 'The Brook Lodge Hotel' are distributed:

<i>Salary (€000)</i>	<i>Number of Employees</i>
20 but less than 40	8
40 but less than 60	16
60 but less than 80	20
80 but less than 100	12
100 but less than 120	4

- (i) Represent the data above on a histogram. (6 marks)
- (ii) Calculate the mean salary, correct to 2 decimal places. (5 marks)
- (iii) Calculate the standard deviation, correct to 2 decimal places. (6 marks)
- (iv) Estimate the mode from the histogram. (3 marks)
- (v) Verify your answer to (d) using a suitable formula. (5 marks)

**Question 5**

(a) How much money would you need to put on deposit today at 9% annual interest compounded monthly to have €12,000 in the account after six years? (7 marks)

(b) The share prices of two companies were recorded on the 31<sup>st</sup> of December in each year between 2013 and 2017:

Year	2013	2014	2015	2016	2017
<i>Company A's Share Price (€)</i>	5.02	7.26	8.90	6.72	7.40
<i>Company B's Share Price (€)</i>	28.82	33.04	34.82	30.94	32.20

(i) Calculate a fixed based index for each of the two share prices, using 2013 as the base year for the two indexes. (5 marks)

(ii) Which company's shares have shown the better performance over the period 2013-2017? Give the reason(s) for your answer. (4 marks)

(c) Hotel cleaning equipment bought for 42,000 euro has a scrap value of 23,000 euro after 4 years.

(i) Using the reducing balance method, calculate the rate of depreciation. (4 marks)

(ii) What is the value of the equipment after 3 years? (5 marks)

## Business Mathematics for Hospitality Formulae

1. Mean  $\bar{x} = \frac{\sum fx}{\sum f}$

2. Standard Deviation  $s = \sqrt{\frac{\sum f(x - \bar{x})^2}{\sum f}} = \sqrt{\frac{\sum fx^2}{\sum f} - \left(\frac{\sum fx}{\sum f}\right)^2}$

3. Median =  $L_M + \left(\frac{\frac{N}{2} - F_{M-1}}{f_M}\right) C_M$

4. Mode =  $L_M + \left(\frac{f_M - f_{M-1}}{2f_M - (f_{M-1} + f_{M+1})}\right) C_M$  or

$$\text{Mode} = L + \left(\frac{D_1}{D_1 + D_2}\right) C$$

5. Pearson's Coefficient of Skewness =  $\frac{3(\text{Mean} - \text{Median})}{s}$

6. Reducing Balance Depreciation  $B = D(1 - i)^n$

7. Compound Interest  $A = P(1 + i)^n$  or  $A = P\left(1 + \frac{i}{m}\right)^{mY}$

8. Annuity/Sinking Fund

Amount  $A = R\left(\frac{(1 + i)^n - 1}{i}\right)$

Present Value  $P = R\left(\frac{1 - (1 + i)^{-n}}{i}\right)$